**NORTHERN VIRGINIA COMMUNITY COLLEGE- ANNANDALE CAMPUS**

**ITN 100 INTRODUCTION TO TELECOM| TERM PROJECT**

THE BEST MEMORIAL HOSPITAL system has 4 hospitals ( H1, H2 , H3 and H4) . They need your service to establish new IT Network.

**IT SYSTEM REQUIREMENTS (EXPECTATIONS)**

* + *Hospitals must be connected to each other*
  + *The patient files are going to be located in the main hospital (H1) and will be shared with all computers within system by using the file transfer applications.*
  + *LAN requirements ( this for all LANs in the system)*
    - *Anticipated Max Data rate for LANs is 100Mbps*
    - *Maximum Range of Wireless Ethernet is 150 Meters*
    - *Maximum Bandwidth of Wireless Ethernet is 54Mbps*
  + *BACKBONE* 
    - *The average distance between clinics to the hospitals is 3 kilometers*
    - *Must use the Best technology available*



* + *WAN Expected data rates between hospitals*

|  |  |
| --- | --- |
| *H1-H2* | *20 Gbps* |
| *H1-H3* | *15 Gbps* |
| *H1-H4* | *2.5 Gbps* |
| *H2-H3* | *155 Mbps* |
| *H2-H4* | *45 Mbps* |

* ENSURE BUSINESS CONTINUITY AGAINST THREATS

Make sure that organization’s data and applications will be protected and will continue to operate even in the face of intrusion, disruption, destruction, or disaster. You should consider applying intrusion Prevention methods here.

NOTE: There are no “Needs analysis” and “budgetary constraints” for this project. You will be working on Technology Design section only.

**NOTE:** Must use <https://www.draw.io/> to develop/draw network diagrams for this project.

.

**H1 HOSPITAL Arlington VA ( Main Hospital)**

* *Employing 150 people (fulltime personnel).*
* *5 story building*
* *In each floor there are three sections (wards) .* 
  + *Each ward has 10 desktop computers (i.e. 10X 3 PCs on one floor)*
  + *Each ward has 5 portable/laptop computers and need wireless connection*
  + *Only One printer for all employees in each section. All office computers must have access to that printer.*
* *Hospital has 3 off-site clinics* 
  + *There are 20 people (personnel) in each site*
  + *Allocating 10 office computer ( PC) for in each site.*
  + *Proving wireless network for 5 portable Laptops and the patients.*
  + *Only One printer for all employees in the clinic. All office computers must have access to that printer.*

**CLINIC 1**

|  |  |  |  |
| --- | --- | --- | --- |
|  | H1 HOSPITAL Arlington VA | | |
| *5* | *ward 1* | *ward 2* | *ward 3* |
| *4* | *ward 1* | *ward 2* | *ward 3* |
| *3* | *ward 1* | *ward 2* | *ward 3* |
| *2* | *ward 1* | *ward 2* | *ward 3* |
| *1* | *ward 1* | *ward 2* | *ward 3* |

**CLINIC 2**

**CLINIC 3**



**H2 HOSPITAL Chicago IL**

* *Employing 100 people (personnel).*
* *3 story building*
* *In each floor there are four sections ( wards) .* 
  + *Each ward has 15 computers (i.e. 15X 4 PCs on one floor)*
  + *Each ward has 5 portable/laptop computers and need wireless connection*
  + *Only One printer for all employees in each wards. All office computers must have access to that printer.*
  + *Proving wireless network for portable Laptops*
* *Hospital has 2 off-site clinics* 
  + *There are 10 people (personnel) in each site*
  + *Allocating 8 office computer ( PC) for in each site.*
  + *Proving wireless network for 5 portable Laptops and the patients.*
  + *Only One printer for all employees in the clinic. All office computers must have access to that printer.*

**CLINIC 1**

|  |  |  |  |
| --- | --- | --- | --- |
| H2 HOSPITAL Chicago IL | | | |
| *Ward 1* | *Ward 2* | *Ward 3* | *Ward 4* |
| *Ward 1* | *Ward 2* | *Ward 3* | *Ward 4* |
| *Ward 1* | *Ward 2* | *Ward 3* | *Ward 4* |

**CLINIC 2**

**H3 HOSPITAL Los Angeles CA**

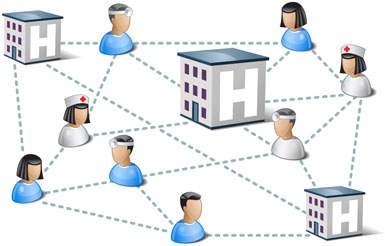
* *Employing 175 people (personnel).*
* *2 story building*
* *In each floor there are three sections (wards)*
  + *Each ward has 7 computers (i.e. 7X 4 PCs on one floor)*
  + *Each ward has 2 portable/laptop computers and need wireless connection*
  + *Only One printer for all employees in each ward. All office computers must have access to that printer.*
  + *****Proving wireless network for portable Laptops*
* *Hospital has no off-site clinics*

|  |  |  |  |
| --- | --- | --- | --- |
| H3 HOSPITAL Los Angeles CA | | | |
| *ward 1* | *ward 2* | *ward 3* | *Ward 4* |
| *ward 1* | *ward 2* | *ward 3* | *Ward 4* |

**H4 HOSPITAL Houston TX**

* *Employing 175 people (personnel).*
* *2 story building*
* *In each floor there are four sections (wards)*
  + *Each ward has 7 computers (i.e. 7X 4 PCs on one floor)*
  + *Each ward has 2 portable/laptop computers and need wireless connection*
  + *Only One printer for all employees in each ward. All office computers must have access to that printer.*
  + *Proving wireless network for portable Laptops*
* *Hospital has no off-site clinics*

|  |  |  |  |
| --- | --- | --- | --- |
| H4 HOSPITAL Houston TX | | | |
| *ward 1* | *ward 2* | *ward 3* | *Ward 4* |
| *ward 1* | *ward 2* | *ward 3* | *Ward 4* |



***F I N A L R E P O R T S E C T I O N S***

Your team will be developing a physical network design where it includes clients, servers, circuits, and networking devices (routers, gateways, access points, switches, etc.) and the list of new hardware needs to be purchased. Prepare your recommendations by covering the following sections.

**NOTE:** Must use <https://www.draw.io/> to develop/draw network diagrams for this project.

**SECTION 1: LAN**

*Design LANs that will be used in the each hospital. One LAN design for all wards and clinics. The same requirements for all LAN designs.*

* LAN FOR EACH Floor.
  + **1- Provide the block diagram** and components of the Local Area Network. Clearly indicate the network topology you would use.

Use <https://www.draw.io/> to develop/draw network diagrams

* + **2-** A **table** format provide the shopping list ( Hardware and software)
    - List of equipment/devices and software
    - Include Types of Dedicated Servers

***SECTION 2: Backbone for hospital and clinic***

* + - *Which Circuit architecture (topology) you would recommend?*
    - *Which Circuit Service you would recommend?*
* H1 HOSPITAL Arlington VA
  + **1-A Provide the block diagram** that covers 3 layers. Clearly indicate the network topology you would use

Use <https://www.draw.io/> to develop/draw network diagrams

* + **2-A Shopping list/table** ( Hardware including cable-types and software)
    - *List Backbone Network Components (Network cable, Switches, Routers and Gateways)*
    - Which Backbone Architecture (topology) you would recommend? And why?
* H2 HOSPITAL Chicago IL
  + **1-B Provide the block diagram** that covers 3 layers. Clearly indicate the network topology you would use

Use <https://www.draw.io/> to develop/draw network diagrams

* + **2-B Shopping list/table** ( Hardware including cable-types and software)
    - *List Backbone Network Components (Network cable, Switches, Routers and Gateways)*
    - The Backbone Architecture/Topology you would recommend? And why?

**SECTION 3: Wide area Network to connect all three sites**

**1-A Provide the block diagram** and clearly indicate the network topology you would prefer.

Use <https://www.draw.io/> to develop/draw network diagrams

**2-A Shopping list**: What type WAN service (s) would you recommend to lease?

*Internet Access Technology recommendation* (*Here you must consider the Best WAN Practices)*

**SECTION 4: RECOMMENDATIONS FOR SECURITY (FOR HOSPITAL IN ARLINGTON VA)**

**1-***List the primary goals in providing security for the complete LAN + BN system.*

**2-** Prepare the Control Spreadsheet which covers

* + - * Lis of Assets in LANs & BNs with priory weights
      * Disruption, destruction and disaster cases
      * Intrusion (both external and inertial )
      * List of control measures to protect the IT system
      * Complete Control Spreadsheet

**GRADE DISTRIBUTION**

|  |  |
| --- | --- |
| Student 1 ( LAN) /**25 points** | Design / Block diagram/ 15 Points  (used www.draw.io) |
| The List/10 Points |
| Student 2 (BN) /**25 points** | Design / Block diagram/15 Points  (used www.draw.io) |
| The List/10 Points |
| Student 3 (WAN) /**25 points** | Design / Block diagram/15 Points  (used www.draw.io) |
| The List/10 Points |
| Security Section ( Team) / **20 points** | List the primary goals / 5 Points |
| Table /15 Points |
| Overall Neatness /Quality /**5 points** |  |